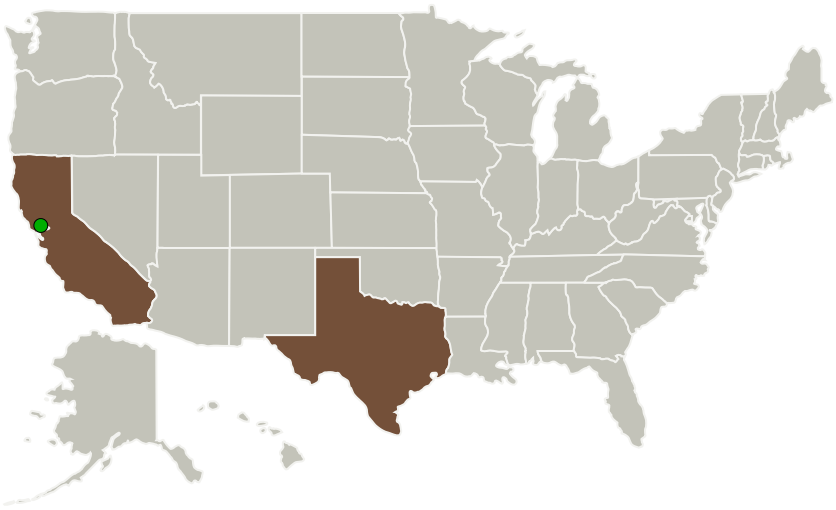
Dynamic State-Based FM Design and Analysis Tool, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Odyssey proposes a new fault management planning and design tool and methodology that uses state-based simulations with programmable dynamic state definitions to provide early assessments of fault management system scope and cost. The tool will utilize models developed in SysML to capture system characteristics and relationships between system components as well as mapping of functionality to requirements and mission objectives, and a probabilistic state-based simulation to determine requirements compliance, fault probabilities, and the number of fault paths in the system. The tool will provide useful visualization of the FM design and fault paths, including the dynamic aspect of the system, as well as visual representations of system complexity. In addition, the tool will provide automated means to estimate the complexity of the FM design based on system characteristics and simulation results. The tool will provide engineers and managers with the ability to scope the fault management (FM) effort from requirements development through verification at a point early in the design process. Phase I will focus on proof of concept and demonstration of key aspects of the tool, with full tool development and scaling to complex systems in Phase II.

Primary U.S. Work Locations and Key Partners



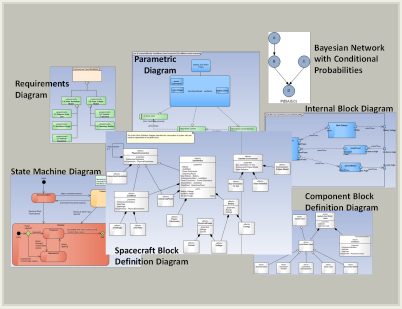


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Dynamic State-Based FM Design and Analysis Tool, Phase I

Completed Technology Project (2015 - 2015)

Organizations Performing Work	Role	Type	Location
Odyssey Space Research, LLC	Lead Organization	Industry Women-Owned Small Business (WOSB)	Houston, Texas
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Texas

Project Transitions

June 2015: Project Start

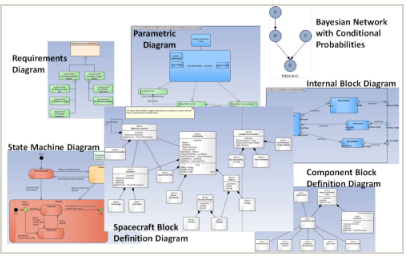
December 2015: Closed out

Closeout Summary: Dynamic State-Based FM Design and Analysis Tool, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138953)*

Images



Briefing Chart Image
Dynamic State-Based FM Design and Analysis Tool, Phase I *(https://techport.nasa.gov/image/135391)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Odyssey Space Research, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

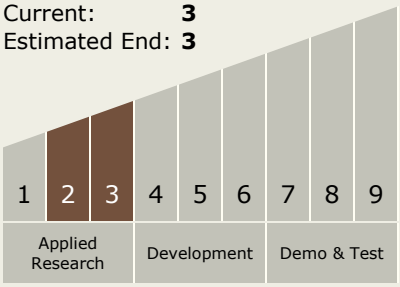
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Denise Brown

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Completed Technology Project (2015 - 2015)

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System